

A NEW SPECIES OF PLANOCERA (*P. GILCHRISTI*)
FROM SOUTH AFRICA.

(Pl. XV., figs. 1-7).

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Among the material at my disposal occurred the above Polyclad which had been found by Dr. Gilchrist near the Marine Laboratory at Cape Town. A single specimen only was available. Although considerably contracted, it was on the whole very well preserved both with regard to external features and histological structure.

The length of the animal is 40 mm., the breadth 28 mm., and the thickness varies from 1 mm. at the sides to $1\frac{1}{2}$ –2 mm. in the central region. The form of the body is broadly oval, both ends being similarly rounded; the margin of the body is strongly folded. It is of a fairly firm consistency and very little transparent.

The ground colour of the back of the specimen (preserved in alcohol) is yellowish white. On this are to be seen black spots of irregular shape, and these are grouped together in small heaps equally distributed over the surface of the back. They form a continuous black line only in the dorsal middle line, in the region of the reproductive organs. On the other hand, the region of the brain area is almost devoid of spots and forms a clear unpigmented area. The small spots are also found on the tentacles in very diminished numbers. They are formed of the pigment which lies in the dorsal epithelium of the body in the form of black particles.

On the dorsal side of the animal two high pointed neck-tentacles can be distinguished, situated 9 mm. from the anterior end, that is, at the end of the first fourth of the body. The distance between them is 2 mm. It is seen by microscopical examination that each tentacle has, at its base, from about fifteen to twenty large, well-developed eyes (fig. 2). The eyes of the brain area, which are not much smaller, are arranged in two rather elongate groups, which lie on the lateral margin of the brain, over which they extend in front and

behind. Each group consists of about twenty to twenty-five eye spots. The brain is well developed and surrounded by a strong capsule somewhat flattened dorso-ventrally. It is far removed from the anterior end and is situated near the pharyngeal sac. The anterior nerve cords and the nerves of the tentacles are remarkably well developed.

On the under side, which is of a dirty white colour, may be seen, even with the naked eye, the mouth and the genital openings, the female opening being surrounded by a fairly well-developed raised wall.

The pharyngeal apparatus is broad and short; it is less than a third of the length of the body and ends close to the male genital apparatus. The pharyngeal sac, which is provided with deep lateral sacs, conceals a strongly folded pharynx, the folds of which are not of any great thickness. The outer mouth lies somewhat in front of the middle of the body and at the commencement of the posterior half of the pharyngeal sac. The gut-mouth is placed somewhat in front of the outer. It leads into a spacious main gut which does not project beyond the pharyngeal sac either in front or behind. It gives off on each side six intestinal branches. The anterior middle branch is rather narrow at that part which lies over the brain, and beyond this it gradually becomes wider. The tree-like branched intestinal canals are exceptionally wide, and are, like the main intestine and pharyngeal cavity, quite filled with food material, the origin of which cannot be determined.

The reproductive organs occupy a relatively large space. They are altogether about $7\frac{1}{2}$ –8 mm. in length, or one-fifth of the total length of the body. The female sexual aperture is situated 8 mm. from the hinder end of the body, that is, between its fourth and its last fifth. The male sexual aperture is situated 5 mm. in front of the female, that is, at the commencement of the last third of the body. The penis and the granule-gland (figs. 3 and 7) of the male and the bursa copulatrix (fig. 7) of the female sexual apparatus appear very peculiarly formed. The penis is a large barrel-shaped muscular organ directed backwards. It passes obliquely from in front and ventrally, to the posterior and upwards. On its dorsal wall is a fairly deep fold. The ductus ejaculatorius, which penetrates the organ, occupies a corresponding position—passing obliquely from in front and ventrally to the posterior and upwards, so that its free end is directed against the dorsal body wall. This position appears to me to be an artificial product, probably brought about by the strongly contracted condition and the consequent folding mentioned above, for the expansion of these parts would

bring about a more normal and horizontal position in the body. The penis consists of a delicate outer muscular tissue and an inner alongside of the ductus ejaculatorius. The musculature is specially well developed at the base of the penis where the inner joins the outer. The arrangement of the muscle fibres is so complicated that I was unable to determine it with certainty. Radially arranged muscular fibres pass from the inner to the outer musculature, the remaining space between which is filled with connective tissue and parenchyma cells. The free surface of the penis bears chitinous spines and is surrounded by the very spacious antrum masculinum produced by a folding in of the ventral wall of the body. The spines (fig. 5) are small, closely set, and with their points slightly bent forwards. In the neighbourhood of the free end of the ductus ejaculatorius the spines are modified in such a way that they appear in the form of small irregular processes which are twice as long as the spine (fig. 4).

The ductus ejaculatorius, which is lined with a cubical ciliated epithelium, extends to the fixed end of the copulatory organ and here divides into a dorsal branch leading to the granule-gland and a ventral branch leading to the seminal vesicle. The granule-gland is rather peculiarly shaped, as shown in fig. 3. It has a central canal with smaller branching canals, which run approximately in the radii of the granule-gland and open at various places in the central canal; this last leads into the ductus ejaculatorius, into which its distal end opens. The radial canals are surrounded by numerous small glandular cells, the small elongate nuclei of which are situated at their bases. The number of glandular canals is considerable; ten to eleven are to be seen in median longitudinal section, and they may altogether be present in considerably larger numbers. The thin musculature of the granule-gland consists of longitudinal muscle fibres provided with nuclei. The numerous nuclei of the parenchyma lie on the outside of these. Extracapsular glands are not present. Below and somewhat in front of the granule-gland lies a small oval seminal vesicle provided with a low flat epithelium. Its musculature is constituted of felt-like somewhat loose fibres. Both the vasa differentia open separately into its blind end. Behind the pharynx they turn round and pass into the large seminal ducts. They are short, somewhat coiled canals with a collection of parenchyma nuclei round their epithelium. Anteriorly they extend to the posterior end of the pharynx and posteriorly to the neighbourhood of the female genital opening without however joining here.

We have to do with an animal not quite sexually mature, and whose sexual apparatus is not yet quite functionally perfect. The

testes are not well developed, the seminal ducts not broad and containing no spermatozoa. The immaturity of the female sexual apparatus is recognised by the limited number and size of the ovaries, as also by the poorly developed uteri and shell gland.

The bursa copulatrix of the female copulatory apparatus is in the form of a large strong muscular egg-shaped organ, the pointed end of which is directed backwards. The inner surface of the bursa copulatrix is provided with rather large closely set papillæ. The largest lie in the centre of the organ, and they gradually diminish in size towards the anterior and posterior regions. They are provided with a broad basis and are partly drawn out into points and partly more or less rounded off. The papillæ are covered with an epithelium which is a continuation of the ventral epithelium of the body, and this varies in different parts of the bursa copulatrix; at its distal end it is extremely flat and its cells are only to be distinguished by their nuclei. Nearer, on the larger papillæ, it loses its nuclei, becomes thickened and assumes the appearance of a strongly refractive chitinous membrane, coloured an intense yellow with picric acid. In its further course it again assumes the characteristics of a flat epithelium, which becomes glandular in character at its anterior end. The papillæ in the bursa copulatrix probably serve in some sort of way as accessory organs of copulation. The anterior end of the bursa copulatrix, which is provided with glandular epithelium, may be regarded as the beginning of the duct of the shell gland, which runs further forward. The shell glands occur in fewer numbers in the epithelium of the duct; in its neighbourhood, *i.e.*, in the parenchyma, there are however none present. The duct is continued forward to the region of the male genital apparatus, here bending round in a backward direction and passing into the oviduct. This is clothed with a cubical epithelium; at its commencement it includes a common part of both uteri and is continued to a point over the middle of the bursa copulatrix. The accessory vesicle is absent. The uteri consist of narrow canals which do not contain any eggs. I was unable to follow them throughout their whole course.

This animal belongs to the family of the Planoceridæ, in which it agrees most closely with the genus *Planocera*, group A, but it differs considerably from other species of *Planocera*. The male copulatory apparatus is characterised by the abnormal structure of the penis and the granule-gland. The difference of the female apparatus from that in other species of this group consists in the peculiar structure of the bursa copulatrix, which is provided with papillæ, and in the absence of the accessory vesicle. I have named this animal *Planocera Gilchristi* in honour of its discoverer.



